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Indoor Air Facts No. 7

Residential Air Cleaners

Air Cleaning

Air cleaning is one of three methods of reducing pollutants in indoor air. In order of effectiveness, the three methods are: 1) removal of the source or control of its emissions, 2)ventilation, and 3) air cleaning. Air cleaning can be used as an adjunct to source control and ventilation. However, air cleaning alone cannot adequately remove all of the pollutants typically found in indoor air.

Should You Use An Air Cleaner?

Many factors need to be considered in determining whether use of an air cleaner is appropriate in a particular setting. Therefore, the decision whether or not to use an air cleaner is left to the individual. **EPA has not taken a position either for or against the use of these devices in the home.**

Will Air Cleaning Reduce Health Effects?

Air cleaners may reduce the health effects from some **particles** - small solid or liquid substances suspended in air, such as dust or light spray mists.

- Some air cleaners, under the right conditions, can effectively remove certain respirable-size particles (for example, tobacco smoke particles). These invisible particles are of concern because they can be inhaled deeply into the lungs. Removing such particles may reduce associated health effects in exposed people. These effects may range from eye and lung irritation to more serious effects such as cancer and decreased lung function.

- Some controversy exists about whether air cleaners can reduce the allergic reactions produced by larger particles such as pollen, house dust allergens, some molds, and animal dander. Most of these particles are found where they settle on surfaces in the home, rather than in the air. They cannot be removed by an air cleaner unless disturbed and resuspended in the air.

Air cleaners that do not contain special media, such as activated carbon or alumina, will not remove **gaseous pollutants**, including **radon**, or reduce their associated health effects. Whether air cleaners that contain these media are effective in reducing health risks from gaseous pollutants cannot be adequately assessed at this time. In addition, the effectiveness of air cleaners in reducing the health risks from **radon progeny** (decay products) cannot be adequately evaluated at present. ***The removal of gaseous pollutants and radon and its progeny is not addressed further in this fact sheet. Health effects from these pollutants may be serious, however, and they are of concern in indoor air.***

Types Of Air Cleaners

Some air cleaners may be installed in the ducts which are part of central heating or air-conditioning systems in homes. Portable air cleaners stand alone in a room.

Types of air cleaners include:

- **Mechanical filters**, similar to, and including, the typical furnace filter.
- **Electronic air cleaners** (for example, electrostatic precipitators) which trap charged particles using an electrical field.
- **Ion generators** which act by charging the particles in a room. The charged particles are then attracted to walls, floors, draperies, etc. or a charged collector.
- **"Hybrid" devices**, which contain two or more of the particle removal devices discussed above.

Assessing Potential Performance

At a minimum, you should consider the following major factors affecting the performance of the air cleaner:

- The percentage of the particles removed as they go through the device (that is, the efficiency).
- The amount of air handled by the device. For example, an air cleaner may have a high efficiency filter, but it may process only 10 cubic feet of air each minute. Suppose that the air cleaner is put in a room of typical size, containing 1000 cubic feet of air. In this room, it will take a long time for all the air to be processed. In some cases, pollutants may be generated more quickly than they are removed.
- The effective volume of the air to be cleaned. A single portable unit used in a room within a large building in which the air flows between several apartments or offices would be of little or no value.
- The decrease in performance which may occur between maintenance periods and if periodic maintenance is not performed on schedule.

Additional Factors To Consider

- Ion generators and electronic air cleaners may produce ozone, particularly if they are not properly installed and maintained. Ozone can be a lung irritant.
- Gases and odors from particles collected by the devices may be redispersed into the air.
- The odor of tobacco smoke is largely due to gases in the smoke, rather than particles. Thus, you may smell a tobacco odor even when the smoke particles have been removed.
- Some devices scent the air to mask odors, which may lead you to believe that the odor-causing pollutants have been removed.
- Ion generators, especially those that do not contain a collector, may cause soiling of walls and other surfaces.
- You may be bothered by noise from portable air cleaners, even at low speeds.
- Maintenance costs, such as costs for the replacement of filters, may be significant. You should consider these costs in addition to the initial cost of purchase. In general, the most effective units are also the most costly.

Obtaining Adequate Performance

Proper installation, use, and care. Follow the manufacturer's directions to assure that the air cleaner works properly. To avoid any electrical or mechanical hazards, be sure the unit is listed with Underwriters Laboratories (UL) or another recognized independent safety testing laboratory.

Perform routine maintenance, as required. Generally speaking, air cleaners require frequent cleaning and filter replacement to function properly.

Proper placement. Place **portable air cleaners** so:

- They are near a specific pollutant source, if one exists.
- They force the cleaned air into occupied areas.
- The inlet and outlet are not blocked by walls, furniture, or other obstructions.

For **in-duct devices**, assure that the inlets and outlets of the heating or cooling system are not blocked by furniture and other obstructions.

Comparing Air Cleaners

One common method of rating high efficiency filters uses a procedure in Military Standard 282. This procedure measures how well small particles of a specific chemical are removed by the filter.

The Federal government has not published guidelines or standards that can be used to determine how well low to medium efficiency air cleaners work. However, standards have been developed by private standard-setting trade associations. These standards may be useful in comparing air cleaners.

For further information on standards for **in-duct air cleaners,** contact your local heating or air-conditioning contractor or:

Air-Conditioning and Refrigeration
Institute (ARI)
1501 Wilson Blvd., 6th Floor
Arlington, VA 22209

For further information on standards for **portable air cleaners**, send a stamped, self-addressed envelope to:

Association of Home Appliance
Manufacturers (AHAM)
Air Cleaner Certification Program
20 North Wacker Drive
Chicago, IL 60606

Additional Information

You can find a more in-depth analysis of air cleaners in the EPA document *Residential Air-Cleaning Devices: A Summary of Available Information.* For this document and other EPA indoor air publications, contact:

Public Information Center
U.S. Environmental Protection Agency
Mail Code PM-211B
401 M St., SW
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